

PRELIMINARY REPORT ON THE ARCHAEOLOGICAL INVESTIGATIONS OF THE WĀDĪ AL-‘ARAB AND TALL ZAR‘A, 2003 AND 2004

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Introduction

In 2001 a new research program — called ‘Gadara Region Project’ — was initiated by the Biblical-Archaeological Institute at the University of Wuppertal (Germany) directed by Prof. Dr. Dieter Vieweger. This project focuses on the interdisciplinary investigation of the Wādī al-‘Arab south-west of Gadara/Umm Qays.

The investigation started with a ceramic survey of Tall Zar‘a, the most promising tall in the Wadi. This has shown that the tall was inhabited from the Early Bronze Age until Ottoman times.

Furthermore, various geophysical methods were used in the exploration. The results demonstrate that there is a thick cultural layer up to 6m in height in many areas of the tall. However, in the tall’s eastern part the bedrock almost reaches the surface.

Detailed information on the aims of the project the geographic situation of the Wādī al-‘Arab and Tall Zar‘a as well as the results of the first survey investigation have previously been published by Vieweger (2002a: 157-177, 2002b: 12-14, 2003a: 191-216, 2003b: 459-461; Vieweger and Häser in press).

A test trench was excavated on the western slope of the tall by Dr. Karel Vriezen of the University of Utrecht in 2001 and 2002. Several architectural phases could be divided. These could be dated by the pottery to the Islamic, Byzantine, Early Iron Age, and Late Bronze Age period. An overview of the first results has been published by Vriezen (2002: 18-19, 2003: 13-14).

The 2003 and 2004 Campaigns

A first larger excavation campaign started in September 2003. It was carried out by the Biblical-Archaeological Institute of the University of Wuppertal and directed by Prof. Vieweger. Excavation activities concentrated on the northwestern slope of the tall. This area (I) was chosen because a significantly high concentration of finds had been found there in the course of the previous survey and because of its exposed position due to its spe-

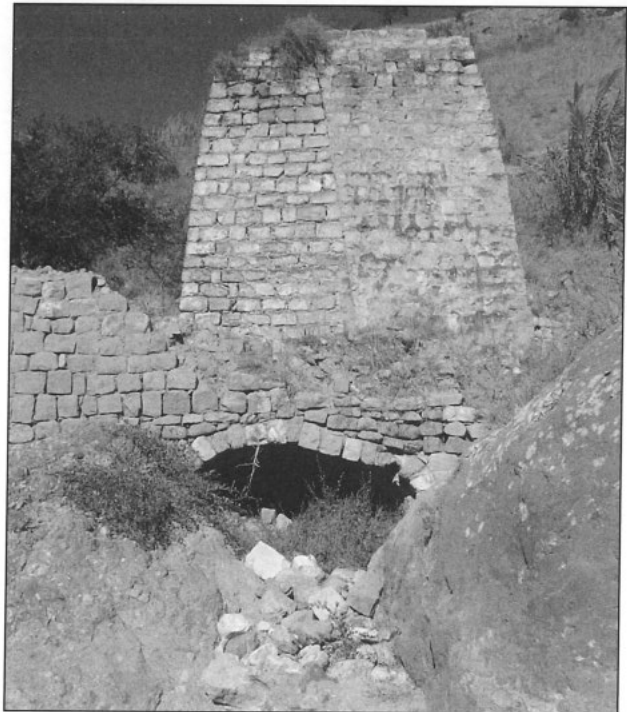
cial topography. Thus, a defense system could be assumed, since there is no natural protection here by the topography unlike on the southeast, east, north, and northwest sides of the tall.

Eight squares (measuring 5m x 5m each) were opened and explored to a maximal depth of 3.3m.

A second campaign was conducted in April 2004 as a co-operative project between the Biblical-Archaeological Institute and the German Protestant Institute of Archaeology, ‘Ammān, directed by Prof. Vieweger and Dr. Häser. Work continued in the previously opened squares, and ten more squares were opened.

A further, ten-day campaign was carried out in July 2004 as part of a study course for theologians, continuing excavations in three of the eastern most squares.

In the Wādī al-‘Arab six water mills were explored and surveyed (Fig. 1). The building con-



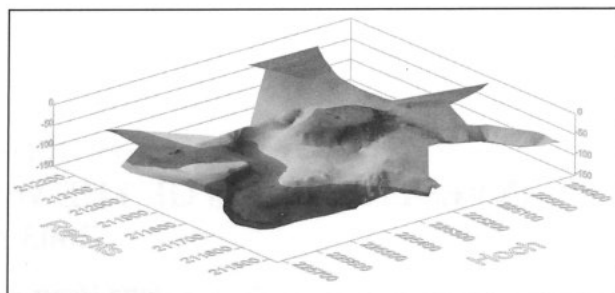
1. Water mill in Wādī al-‘Arab.

struction and milling technology of these mills as well as the water supply system will be studied during forthcoming years.

A survey was carried out in the Wādī al-‘Arab with the help of a digital global positioning system (GPS). It provides the basis of a digital terrain model (Fig. 2) in order to map different archaeological features in the wadi.

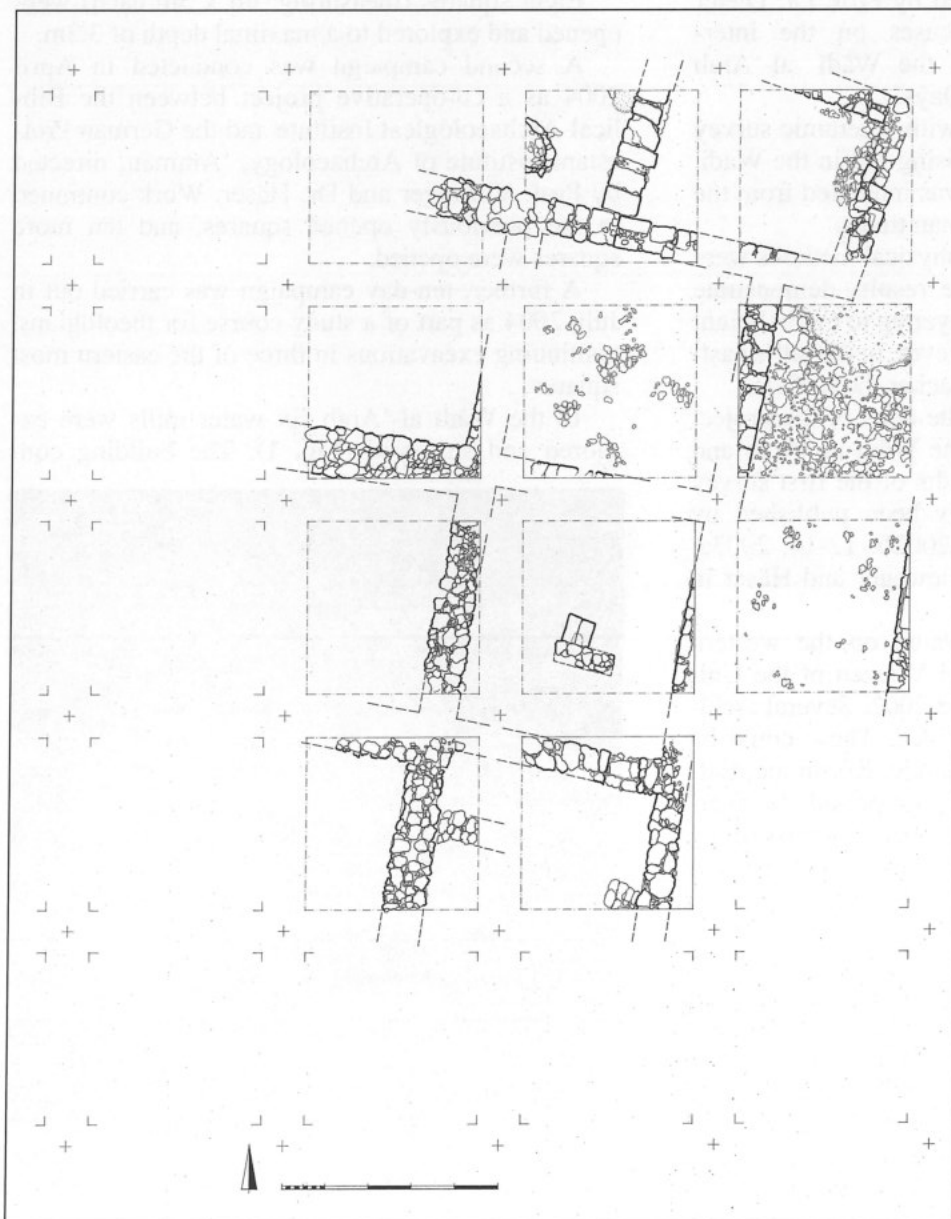
Results of the Excavation (Figs. 3-5)

During the excavations in 2003 and 2004 five strata were exposed. They were labeled 1 to 5 from top to bottom. In the uppermost stratum (1), the remains of three large houses were uncovered. They are orientated almost exactly northward. The location of the entrance is unresolved at this stage of

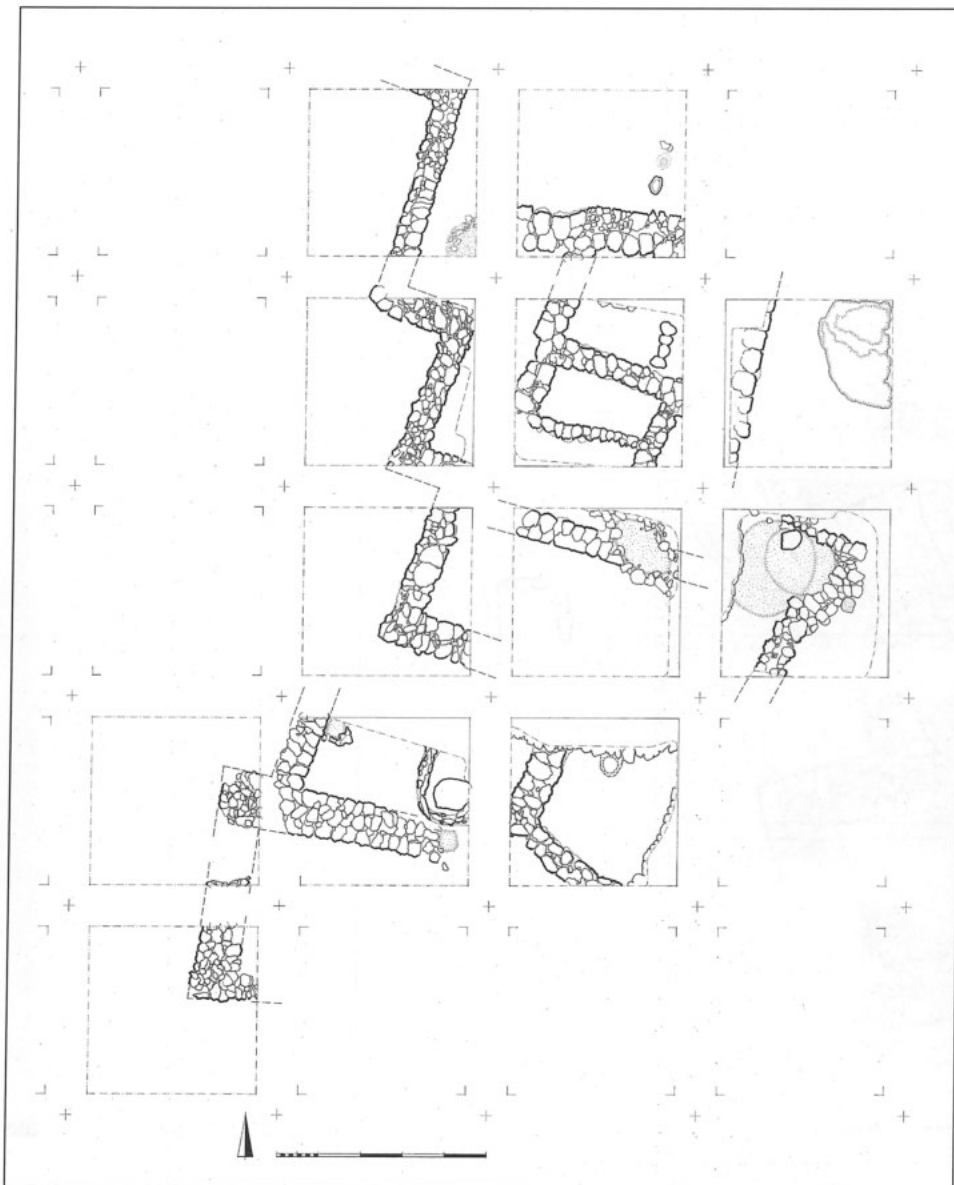


2. Digital elevation model of Tall Zar'a.

the excavation. Two of the houses are joined a third one is situated east of them, separated by a 4m wide stone-paved road. The walls are built with undressed and some dressed stones. The latter are *spolia* from a building elsewhere. The walls rest on



3. Area I, Stratum 1 (Roman-Byzantine Period).



4. Area I, Stratum 2 (Iron Age II).

the butt of walls dating from the Iron Age II, i.e., stratum 2.

The westernmost house, no. 1, consists of at least six rooms. They have an average dimension of 4m. In one of the rooms, a threshold (AL 118), a column base and, adjoining it, a narrow bench (AM 118) were found. The column base points to the fact that this area was roofed. The area east of the threshold might not be a room but a courtyard.

House no. 2, to the north of house no. 1, consists of at least of two rooms (AO 117-119). The northern limits have not yet been reached. A stone-lined pit was excavated in the western room (AO 118).

Toward the western part of the slope, the buildings are eroded near the edge of the slope's steep incline.

House no. 3 is marked only by a single wall running from west to east (AM 119).

The pottery found in the houses can be dated to the Roman-Byzantine period. In addition, fragments of glass vessels and some coins were uncovered. The coins have not been dated yet since they have not been cleaned.

A deep pit with a diameter of about 4m was discovered under the paved road (AM/AN 119). It contained a mass of Roman-Byzantine pottery. It was presumably built when this area was not covered with houses.

The two subsequent strata (2 and 3) can be dated to the Iron Age. These strata are disturbed in many parts by large pits of the Roman-Byzantine period. Nevertheless, remains of a settlement wall and some houses could be traced.



5. Area I, Stratum 4 (Late Bronze Age).

The western limit of the built-up area of stratum 2 is marked by a sawtooth-like wall following the curve of the tall (AL-AO 117). Due to the balk it is unclear if the wall found in the squares AK-AL 116 is a continuation of the aforementioned wall. Both walls are built with field stones and are 1-1.20m wide. They are constructed on the casemate wall of the Late Bronze Age period.

An area with the remains of a house was discovered east of the defence wall. A room structure can be observed in the center of the area (AM-AO 118). The outer limits of this structure have not been excavated yet. Therefore, the building type cannot be determined as yet. Two building phases can be distinguished. In the first phase, two ovens were cut into the floor level. These were destroyed in the second phase. One of these ovens was partly covered by a wall constructed between two east-

west running walls (AN 118). Another wall was built parallel to the west, forming a new room.

A well-prepared working area with a large flat grinding stone was built in the south (AL 117). This stone is surrounded by two rows of standing stones like a stone-lined silo. The connection of this working area with the room structure is still undetermined. The pottery shows that stratum 2 can be dated to the Iron Age II.

The architectural remains of stratum 3 were also disturbed by later construction work. Therefore, a coherent building structure cannot be observed. However, the remains of the walls of this stratum follow a consistent orientation running northwest by west to southeast by east or join them forming a right angle. Most of the walls were excavated in the squares AL-AO 117.

Two *tābūn*(s) were discovered in AM 117 and

AO 117, and a considerably large oven was uncovered in square AM 118.

The walls of stratum 3 are based on the remains of the preceding Late Bronze Age city wall in many places. These walls were built with field stones and are thin. The remains of the Late Bronze Age tower were used as the foundation for a hearth. In addition, stone-lined pits were dug in the remains of the Late Bronze Age city wall in squares AM 117 and AO 117.

In the slope terrain of the excavation area (AK-AM 115 and AK-AO 116/117) the layers of the Late Bronze Age (stratum 4) could be excavated. A casemate city wall protected the western slope in this period (Fig. 6). It was built above the Early Bronze Age glacis, separated from it by a meter high deposit. A small stone-lined pit was found in one of the rooms of the wall (AM 116). To the south, a room paved with stones was uncovered. From this room a passage leads into another stone-paved room, which is surrounded by 2m thick walls. Presumably, this was the interior of a tower. This might have been part of gate or a poterne, which can be expected south of the present excavation area.

A street runs parallel to the casemate wall on its east side. The width of the street cannot be measured at this stage of excavation. The street has a canal, which is covered by large stones. It collected water from two sides, draining it into another room or basin (AM 116/117). It can be assumed that the 3m deep shaft beyond the city wall in square AM 115 was part of this construction. At the foundation level of the Early Bronze Age glacis the shaft deviates from the vertical at an angle

of about 30°. Just as the architecture of the Late Bronze Age is very prestigious, so are the finds. Various bronze objects have been found like remains of a dagger, a needle and a mirror as well as imported Mycenaean and Cypriote pottery. Several stone vessels, including an alabaster stand, imported pottery and bronze fragments were discovered in an architectural structure, which can probably be reconstructed as a room of a building with several installations.

Stratum 5 is represented by a 3m high glacis running along the western hill. This glacis and the basis of the city wall can be dated to the Early Bronze Age. The shaft mentioned before cuts it vertically. At the moment only the outer skin of the glacis is visible. The results of the survey suggest that the levels between the Late Bronze Age and the Early Bronze Age stratum are several meters thick.

The Pottery Analysis (Figs. 7-11)

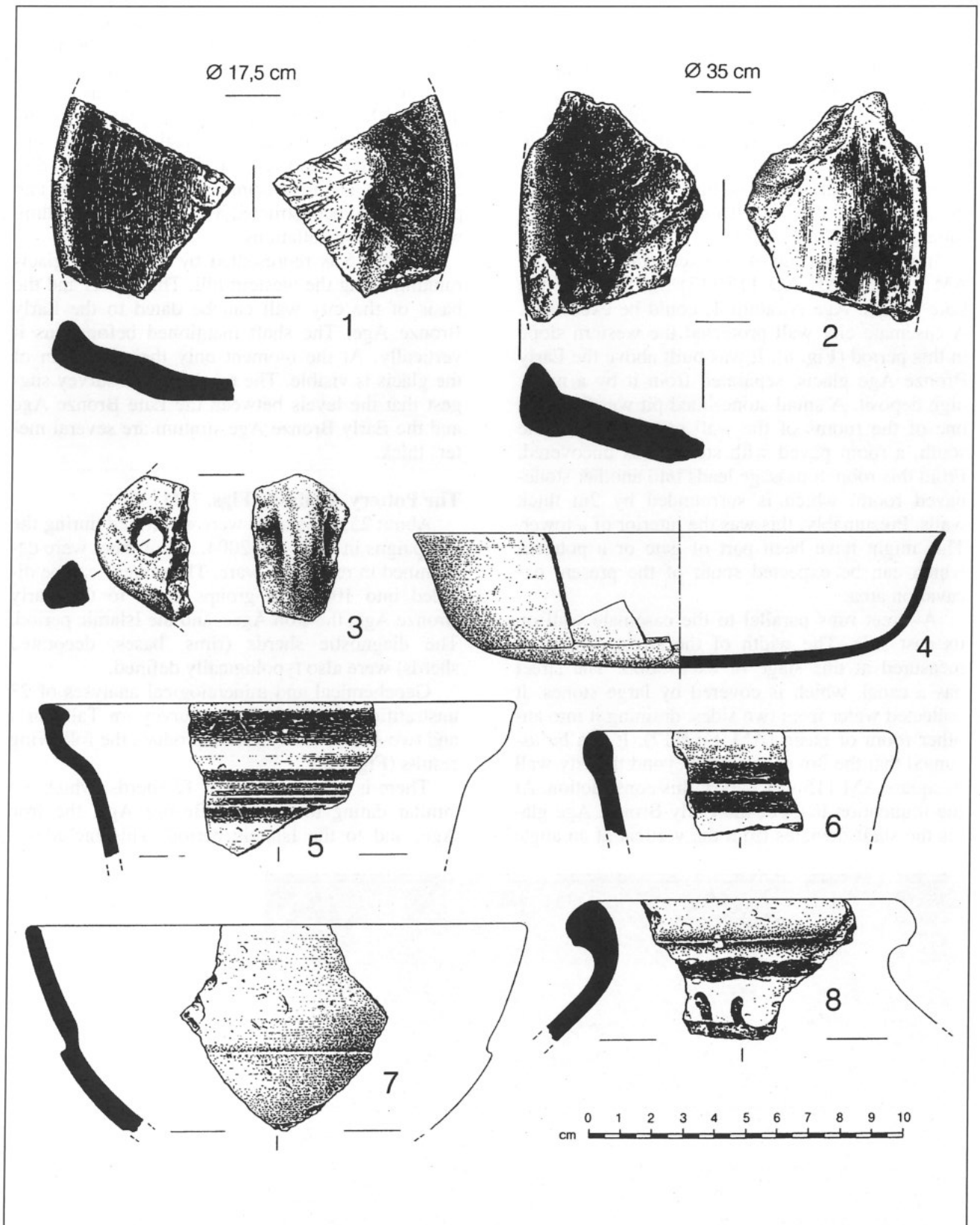
About 25,000 sherds were excavated during the campaigns in 2003 and 2004. All of them were determined in respect to ware. The pottery can be divided into 100 ware groups dated to the Early Bronze Age, the Iron Ages, and the Islamic period. The diagnostic sherds (rims, bases, decorated sherds) were also typologically defined.

Geochemical and mineralogical analyses of 23 unstratified sherds from the survey on Tall Zar‘a and two sherds from Gadara produce the following results (Fig. 12).

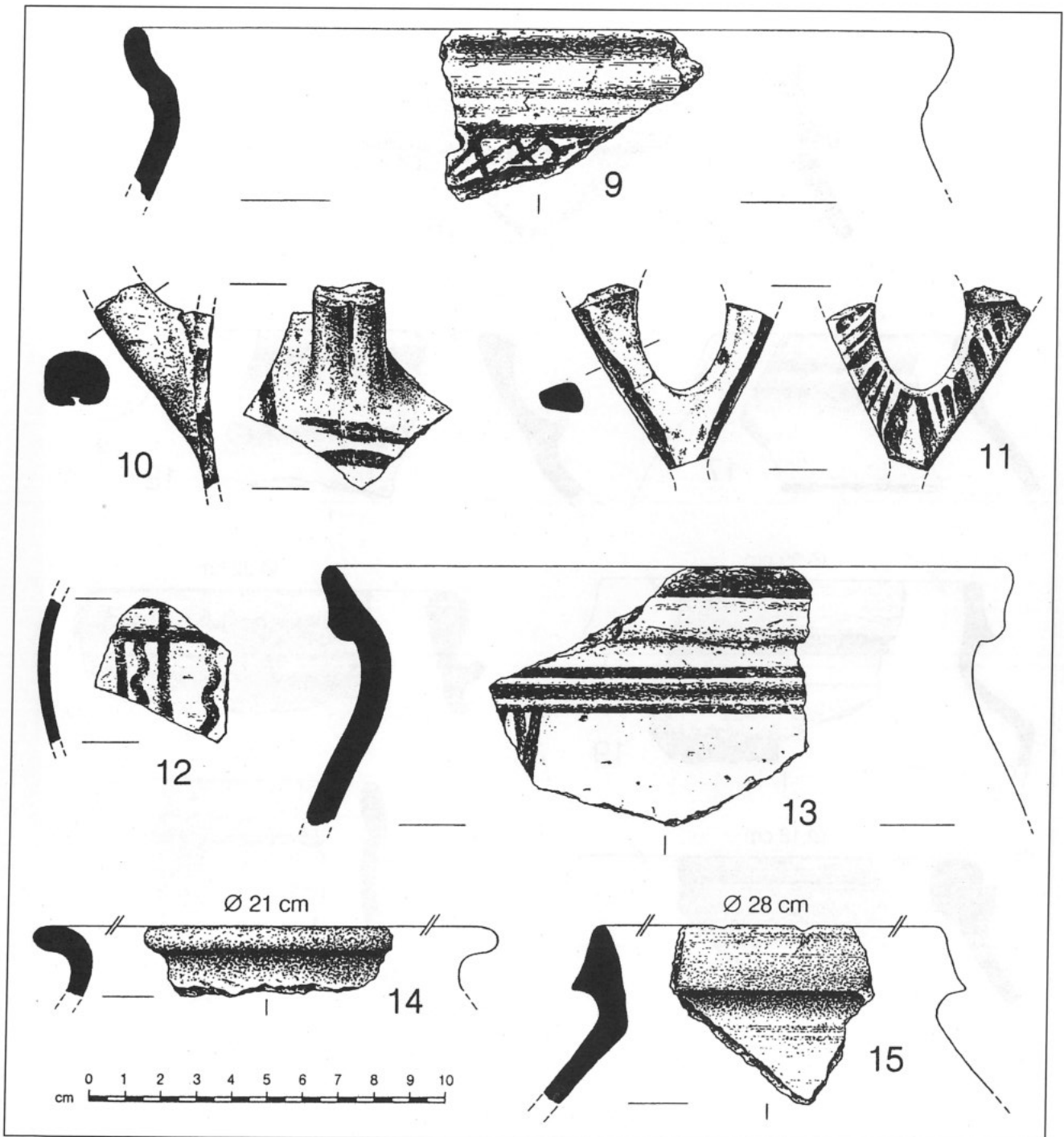
There is a main group of 12 sherds, which are similar dating to the Late Bronze Age, the Iron Age, and to the Islamic period. This includes a



6. Late Bronze Age casemate wall.



7. 1-3 handmade ceramics of the Early Bronze Age II/III; 1 TZ 1187-5 (context 80); 2 TZ 1520-6 (context 207); 3 TZ 1407-2 (context 172); 4-8 wheel-made ceramics; 4 TZ 1323-1 (context 143, Middle/Late Bronze Age); 5 TZ 1445-7 (context 168, Late Bronze Age II); 6 TZ 1498-12 (context 223, Late Bronze Age II/Iron Age I); 7 TZ 1412-7 (context 166, Late Bronze Age II); 8 TZ 1395-2 (context 155, Late Bronze Age II).



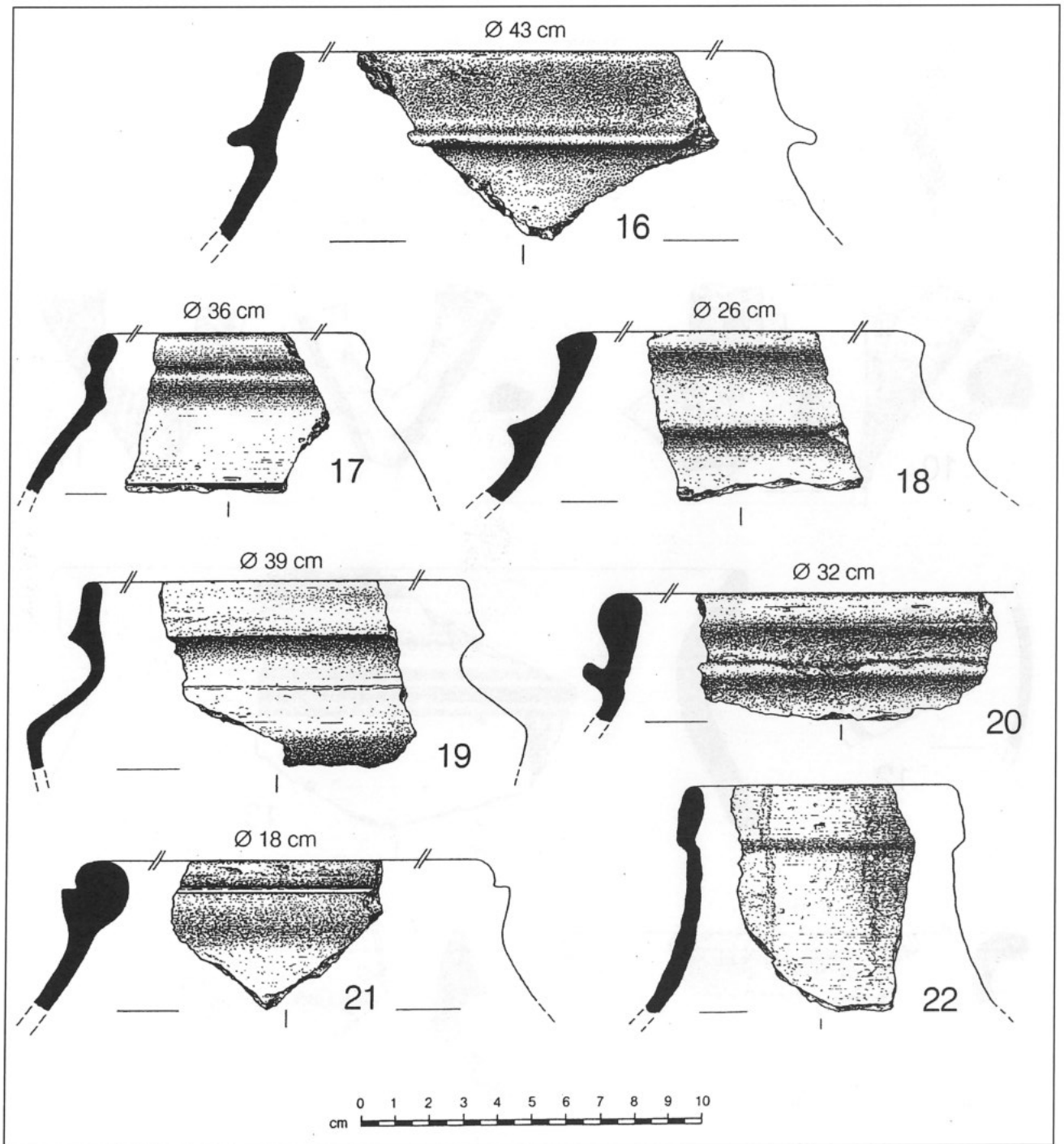
8. 9-13 Wheel-made ceramics of the Late Bronze Age: 9 TZ 1571-3 (context 235); 10-13 "Imports"; 10 TZ 1223-5 (context 67); 11 TZ 1088-1 (context 32, from Cyprus); 12 TZ 1380-2 (context 154, from Cyprus?); 13 TZ 1591-2 (context 244); 14-15 Cooking pots; 14 TZ 1450-7 (context 168); 15 TZ 1450-8 (context 168).

group of three very similar Iron Age sherds. All these pottery sherds probably originate from the surroundings of Tall Zar'a.

Five sherds from Tall Zar'a belong to a subgroup, which can also be included in the main group. Three sherds from Tall Zar'a are similar to Gadara-sample 1. One other sherd from Tall Zar'a

resembles Gadara-sample 2. Four sherds are so different in composition that they belong neither to the main group nor to the Gadara samples.

Generally, it can be said that the pottery sherds of the Bronze and Iron Ages as well as from the Islamic period come from the surroundings of Tall Zar'a. In Hellenistic and Roman-Byzantine times



9. 16-21 Cooking pots from the Iron Ages: 16 TZ 1410-6 (context 162); 17 TZ 1441-2 (context 168); 18 TZ 1129-6 (context 51); 19 TZ 1177-10 (context 81); 20 TZ 1184-4 (context 53); 21 TZ 1111-12 (context 31); 22 TZ 1350-2 (context 150).

the pottery sherds show a strong similarity with samples from Gadara.

These results have to be scrutinized with the aid of stratified samples from the excavation on Tall Zar'a.

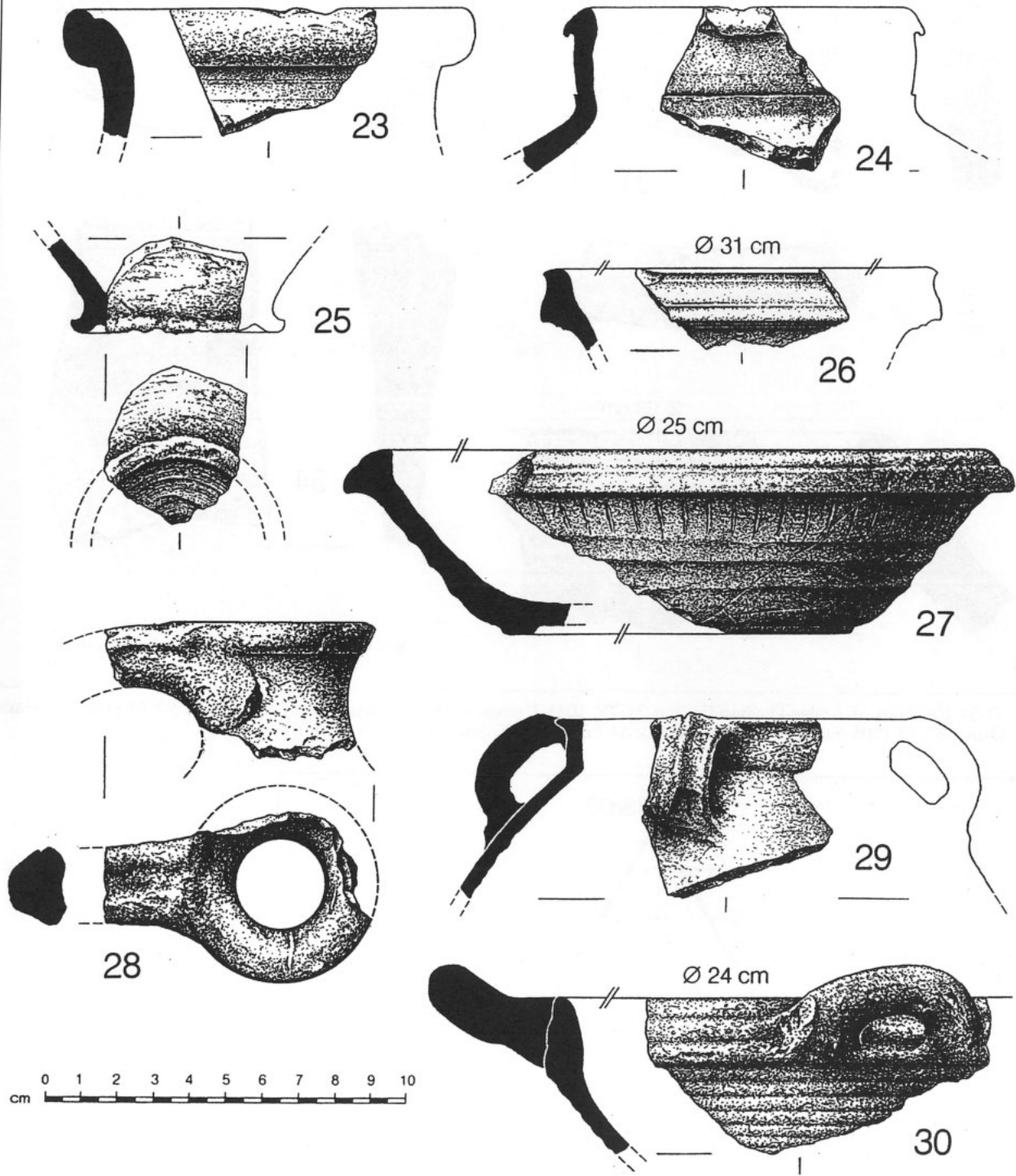
The Aerial Survey

Surveying and photogrammetric mapping have

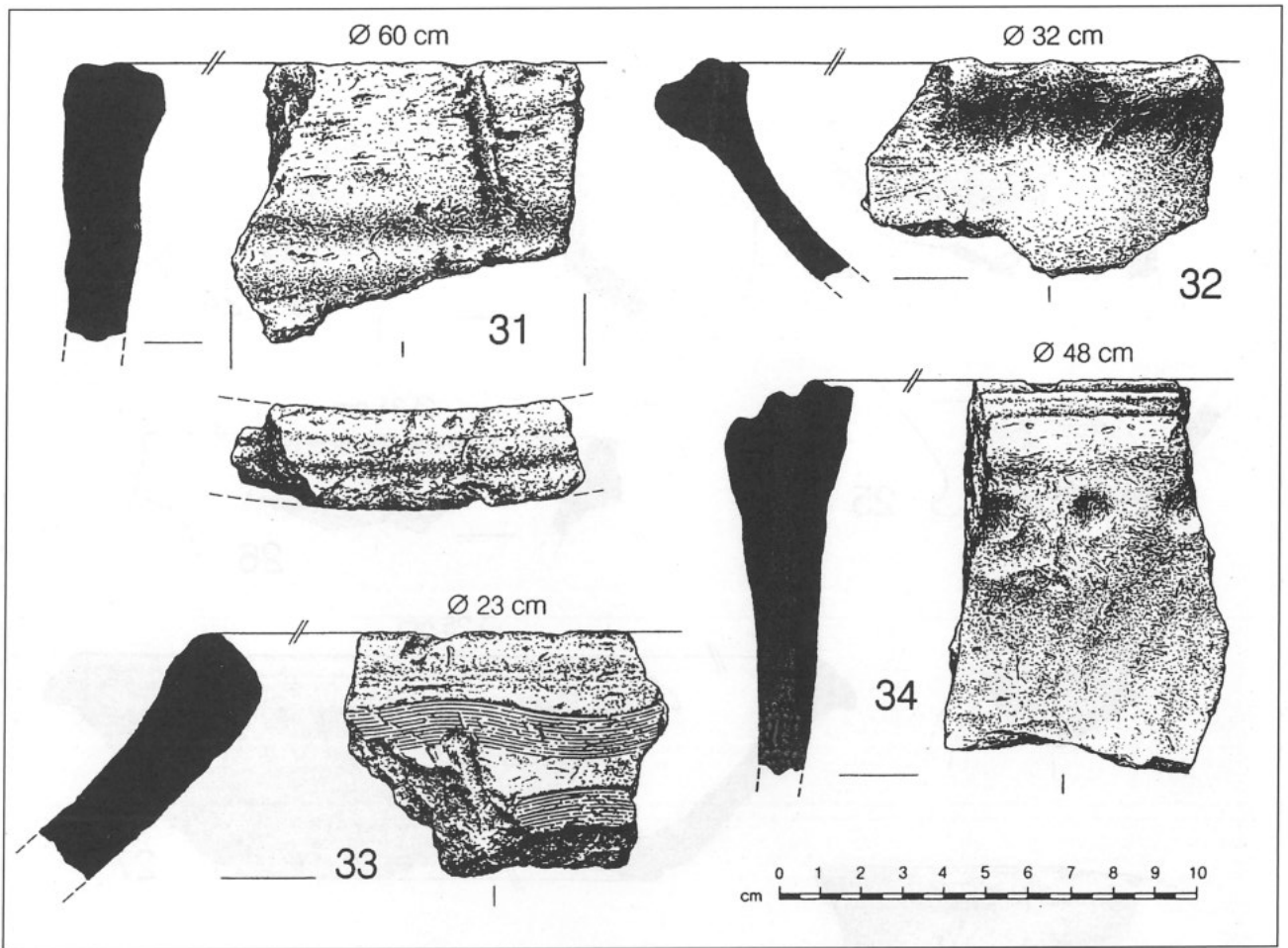
made new research methods for archaeology possible by a combination of modern equipment with digital technologies.

Aerial Photogrammetry for the Production of Site Maps Respectively Topographical Maps

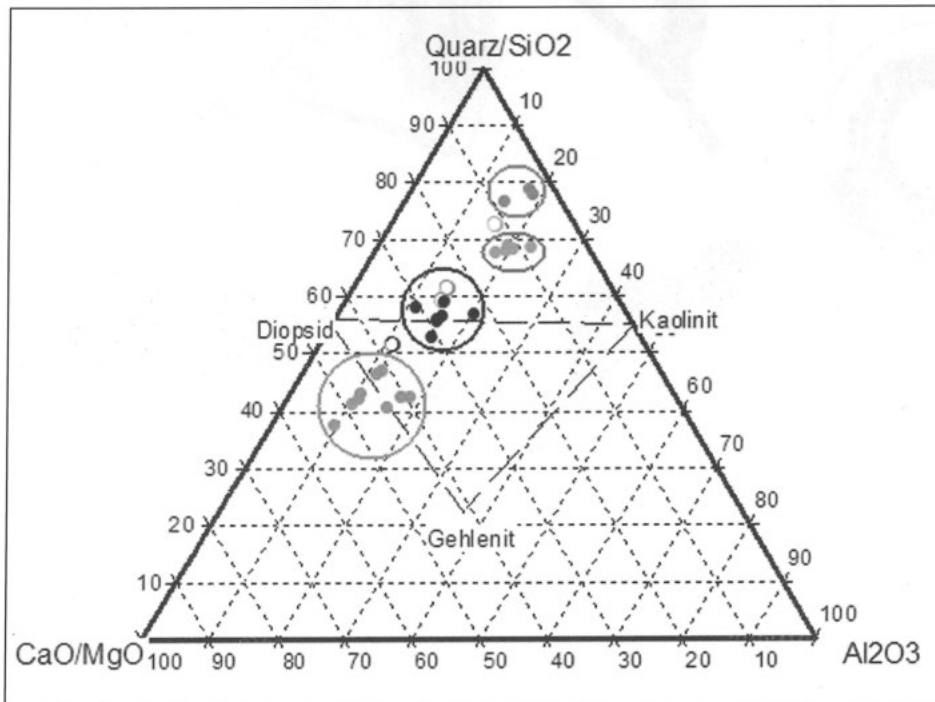
The mapping of features in large-scale surveys has long since been carried out by GPS in an ef-



10. 23-29 Wheel-made ceramics of the Hellenistic, Roman and Byzantine Era: 23 TZ 1063-8 (context 16, Late Hell.); 24 TZ 1192-3 (context 53, Late Hell.); 25 TZ 1437-1 (context 181, Late Hell.); 26 TZ 1042-11 (context 3, Rom.-Byz.); 27 TZ 1035-24 (context 6, Rom.-Byz.); 28 TZ 1002-9 (context 1, Late Rom.-Byz.); 29 TZ 1189-7 (context 92, Late Rom.-Byz.); 30 TZ 1003-2 (context, late Rom.-Byz.).



11. 31-34 Ceramics of Arabic-Omayyadic Era; 31 TZ 1031-1 (context 16, Late Byz.-Oma.); 32 TZ 1173-5 (context 53, Mam.-Osm.); 33 TZ 1006-5 (context 2, Mam.-Osm.); 34 TZ 1002-11 (context 1, Late Byz.-Oma.).



12. 'Fingerprint' of ceramics from Tall Zar'a.

fective and time saving way. We combined this mapping method with the recording of objects, as has been common in archaeology for some time: a camera platform, equipped with three-dimensional mobility via remote control, was fastened to a helium-filled balloon. With a rope, the balloon was tied up on the ground or directed to the areas to be surveyed. In order to take photos, the camera had to be positioned almost perpendicularly above the areas to be mapped. This was done with the help of radio telecontrol. The section in the viewfinder was relayed digitally to a ground station (TFT monitor or head-display during strong sun radiation). Photos taken from heights of up to 135m supplied ground segments of maximally 15,000m² per picture. On one hand, these photos served as photographs for specific site data supplemented by GPS data. On the other hand, the overall view of the excavation area and its surroundings could be impressively documented. The pictures were rectified and assembled into a collage by way of control points (Fig. 13).

Photogrammetry Used in the Documentation of Archaeological Features

Similarly, the excavation squares on Tall Zar'a were documented with the help of modern technological equipment. On a daily basis, nearly perpendicular photos were taken from ca. 4m above the squares. First, the distortion of the objective was corrected. Then the digital photographs were

rectified via control points (here the corner points of the squares) (Fig. 14). In this way, both the progress of the excavation could be documented and site sketches produced with great accuracy.

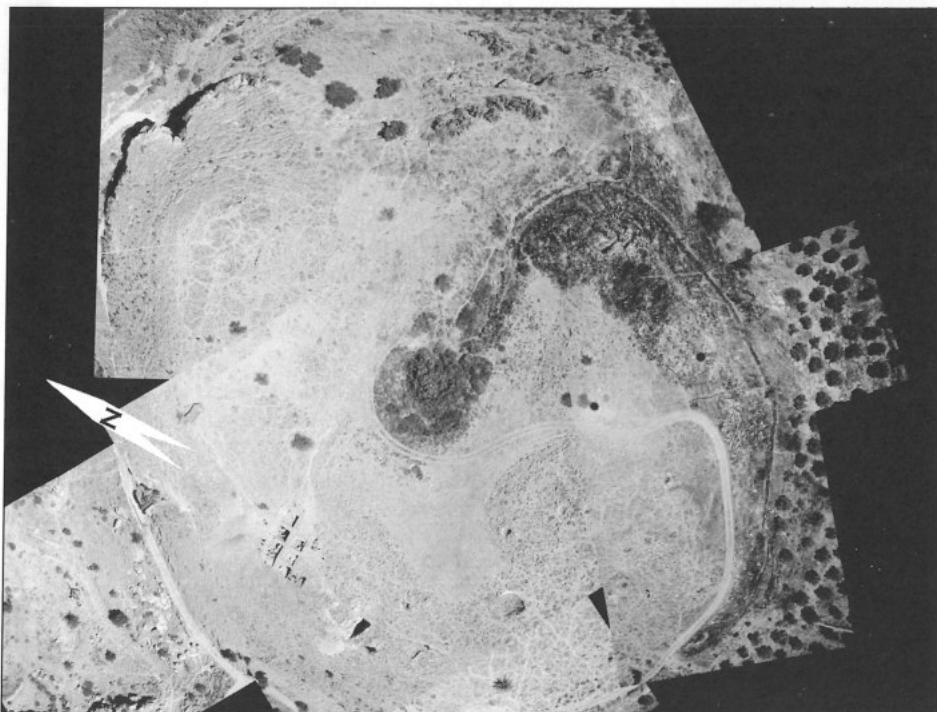
The evaluation of these photographs should be undertaken jointly by the surveyor and the archaeologist in charge to ensure that the represented data are correctly interpreted. To improve our techniques means, we will in future campaigns analyze potential error sources inherent in deeply excavated squares and consider the former's elimination while looking at aspects of practicality and accuracy.

Experimental Archaeology

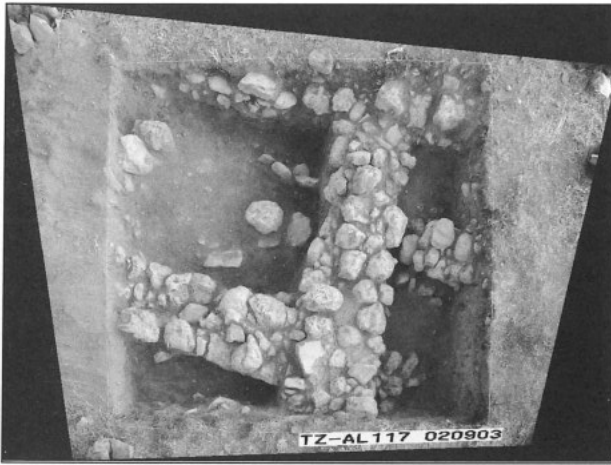
Following the excavation in 2003, a project with a technological-historical background was carried out. Within three weeks, Mustafa Saleh, the son of the last Ṭābūna still living in Umm Qays (Fig. 15), built a bread-baking oven commissioned by the Biblical-Archaeological Institute. Our analysis comprised the following: the origin, grinding, cleaning, and mixing of the clay, origin and use of added materials (e.g., rush and goat hair), manual construction of the oven, special make-up of the oven's base and upper rim, preparation of the pit in which the oven was set, heating it and, of course, the baking of bread.

Acknowledgments

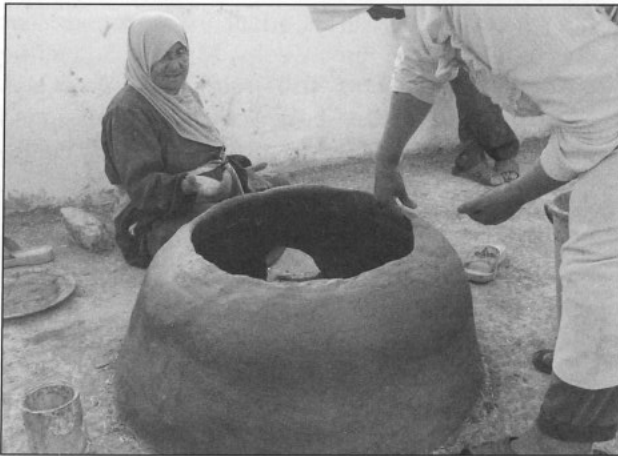
We would like to extend cordial thanks to the



13. Mosaic of rectified photographs taken from a helium filled balloon.



14. Rectified photograph of a square.



15. Ṭābūna at work.

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